

1 459 875

- (21) Application No. 12812/74 (22) Filed 22 March 1974 (19)  
 (61) Patent of Addition to No. 1 289 718 dated 25 Sept 1969  
 (31) Convention Application No. 2558/73 (32) Filed 22 March 1973 in  
 (33) Austria (OE)  
 (44) Complete Specification published 31 Dec. 1976  
 (51) INT. CL.<sup>4</sup> F16B 13/04  
 (52) Index at acceptance  
 F2H 16A1 16D 16G 16R



(54) A METHOD AND AN INSERT FOR ANCHORING A SCREW OR NAIL IN  
 A BORE HOLE IN MATERIAL WHICH CAN ROT OR DECAY

- (71) We, NEUMANN & Co. GESELLSCHAFT m.b.H., an Austrian Body Corporate, of A 2604 Theresienfeld Nr. 106, Austria, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- The present invention relates to a method and an insert for anchoring a screw or nail in a bore hole in material which can rot or decay.
- The present application is for a patent of addition to patent number 1,289,718.
- A known process for anchoring or securing screws or nails, particularly screws for ties and nails for railway track, within bore holes provided within material which can rot or decay such as wood or the like, consists in that the bore hole is first drilled out to a diameter larger than the diameter required for a firm fit of the screw or nail. The screw is then screwed into the bore hole, or, the nail run into the hole, after having introduced an insert of material, particularly iron, into the hole, and of such a thickness that the insert will clamp the screw or nail within the bore hole, and a hardenable or curable synthetic resin composition. Also known is a device for performing the above mentioned process. According to the above mentioned process the screws or the like may be clamped within bores of larger diameter within the tie by means of the insert such that the screw may be tightened as long as the synthetic resin, which will prevent the wood from becoming rotten, has not yet become cured. This provides the advantage that, on the one hand, the screw can be firmly tightened and be maintained in its clamped position until the moment of hardening of the synthetic resin without the necessity of using presses and, on the other hand, the railway track can be travelled on prior to hardening of the synthetic resin. The known process is particularly suitable for restoring screw holes within railway ties of sleepers, since by drilling out the hole to a larger diameter rotten wood can be removed and the screw or nail seated within sound wood. According to the known process and device the insert is a wound wire helix.
- In a first aspect the present invention provides a method of fixing a screw or nail in a bore hole in a material which can rot or decay, the method including inserting into the hole a tubular wire mesh or grid insert of robust material for anchoring the screw or nail in the hole, and also a curable or hardenable synthetic resin composition, and screwing the screw or driving the nail into the hole such that it is gripped by the insert which itself is clamped against the wall of the hole, while spaces remaining between parts of the insert and the screw or nail and extending to the hole, are filled with the synthetic resin to thereby bind the screw or nail in position.
- In a second aspect the present invention provides an insert for anchoring a screw or nail in a bore hole in material which can rot or decay, comprising a tubular wire mesh or grid of robust material adapted to engage the wall of the bore hole and for receiving the screw or nail, the wire mesh or grid being of such a thickness that it will anchor the screw or nail within the bore hole, and a breakable container insertably positioned within the wire mesh or grid and containing a hardenable or curable synthetic resin, whereby when the screw or nail is received within the mesh or grid it breaks said container to permit the synthetic resin to harden within the hole and around the screw or nail anchored in said wire mesh or grid.
- The tubular wire mesh or grid may be a plane wire mesh or wire grid bent to a tubular shape. The wires preferably consist of metal, i.e. preferably of steel. Such a tubular wire mesh or wire grid has proved to be a particularly suitable insert because engagement of the wall of the hole is comparatively uniform within the areas occupied by the wire mesh or grid, the wire mesh or grid contributes to an even distribution of synthetic resin within any area and to the

formation of a direct bridge between screw and nail, on the one hand, and wall of the hole, on the other hand.

In an insert according to the invention, the arrangement is conveniently such that the container positioned within the tubular body formed by the wire mesh or grid, may be a glass vial which contains a curable synthetic resin and, separated therefrom, a hardener therefor. This is easily possible in view of the tubular shape of the insert, noting that the tubular wire mesh of grid protects the glass vial from becoming broken on transport or storing. A glass vial additionally has the advantage that when screwing the tie into the hole, the vial will break into small pieces which will become still further subdivided on further introducing the screw. The container containing the hardener and conveniently consisting also of glass will likewise be destroyed. In contrast to a vial of synthetic resin, the curable synthetic resin and the hardener will thus be thoroughly mixed and the fine glass particles provide the advantage of acting as a filler material within the synthetic resin and of further improving anchoring of the screw within the hole.

The present invention will now be more fully described by way of example, with reference to the accompanying drawings, wherein:—

Figure 1 is a perspective view of an insert according to an embodiment of the present invention;

Figure 2 is a cross sectional view of the insert of Figure 1;

Figure 3 illustrates a tie screw inserted in the insert in a bore hole in a material which can rot or decay;

Figure 4 is an enlarged view showing the connection between an insert in a bore hole and a tie screw screwed therein.

The insert shown in Figures 1 and 2 consists of a wire mesh 1 in which the wires are arranged in an axial direction and in a direction perpendicular to the axial direction. The wire mesh is rolled up to a tubular shape from a plane wire mesh grid. Within the tubular wire mesh 1 a glass vial 2 is located containing curable synthetic resin. Within this glass vial 2 a smaller glass vial 3 is located which contains a hardener. Both glass vials are closed. A tie screw 4 (Figure 3) is screwed into a hole 6 of tie 7 after insertion of the tubular wire mesh 1 together with the vials 2, 3 and extends through a hole of the bed plate 5. The bore 6 within tie 7 has no greater diameter than the hole 8 within the bed plate 5 so that the bore 6 can be produced by drilling *via* said hole 8.

When screwing the tie screw 4 into place, the vials 2 and 3 are crushed to fine

fragments, and the resin and the hardener are thoroughly mixed so that the prerequisites for curing the synthetic resin are fulfilled and the fine glass particles act as a filler material and, respectively, as a reinforcing material for the synthetic resin composition. Further when screwing the screw into place, the tubular wire mesh will become deformed and the tubular wire mesh 1 will clamp the screw within the hole 6 such that the screw is secured in position even prior to hardening of the synthetic resin to bind the screw in position. Thus a press need not be used, and railway track for example, constructed using the screws 4 to anchor the bed plates 5 to the track sleepers can be travelled on prior to hardening of the synthetic resin.

The wire gauge is selected such that the screw 4 will become clamped within the hole. The wire gauge can amount to 5 to 15% of the average diameter of the screw or nail and can, for example, amount to 1 to 3 mm. The clearance *a* between the wires may amount to at least twice the wire gauge *b*, so that between the wires a direct bridge of synthetic resin may result between the wall of hole 6 and the screw 4. Such a wire gauge is sufficient for the desired clamping action and ensures that the wire will not become excessively thin when the screw is screwed into the hole.

#### WHAT WE CLAIM IS:—

1. A method of fixing a screw or nail in a bore hole in a material which can rot or decay, the method including inserting into the hole a tubular wire mesh or grid insert of robust material for anchoring the screw or nail in the hole, and also a curable or hardenable synthetic resin composition, and screwing the screw or driving the nail into the hole such that it is gripped by the insert which itself is clamped against the wall of the hole, while spaces remaining between parts of the insert and the screw or nail and extending to the hole, are filled with the synthetic resin to thereby bind the screw or nail in position.

2. A method as claimed in claim 1 wherein the thickness of the wire of the grid or mesh is from 5 to 15% of the average diameter of the screw thread or diameter of the nail.

3. A method as claimed in claim 1 or claim 2 wherein the thickness of the wire of the grid or mesh is 1 to 3 mm.

4. A method as claimed in any one of claims 1 to 3 wherein the clearance between the wires is at least twice the thickness of the wire.

5. A method as claimed in any one of claims 1 to 4 wherein the wires of the wire grid or wire mesh extend in an axial direc-

tion of the tube and perpendicularly relative to said axial direction.

6. A method as claimed in any one of claims 1 to 5 wherein the synthetic resin is inserted in the hole in a glass vial containing, separate from one another, the curable synthetic resin and a hardener therefor.

7. A method for anchoring a screw or nail in a bore hole in material which can rot or decay, according to claim 1 substantially as herein described.

8. An insert for anchoring a screw or nail in a bore hole in material which can rot or decay, and comprising a tubular wire mesh or grid of robust material adapted to engage the wall of the bore hole and for receiving the screw or nail, the wire mesh or grid being of such a thickness that it will anchor the screw or nail within the bore hole, and a breakable container in-

sertably positioned within the wire mesh or grid and containing a hardenable or curable synthetic resin, whereby when the screw or nail is received within the mesh or grid it breaks said container to permit the synthetic resin to harden within the hole and around the screw or nail anchored in said wire mesh or grid.

9. An insert as claimed in claim 8 wherein said breakable container is a glass vial containing, separate from one another, a curable synthetic resin and a hardener therefor.

10. An insert for anchoring a screw or nail in a bore hole according to claim 8 substantially as herein described with reference to and as illustrated in the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1976.  
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,  
from which copies may be obtained.

FIG.1

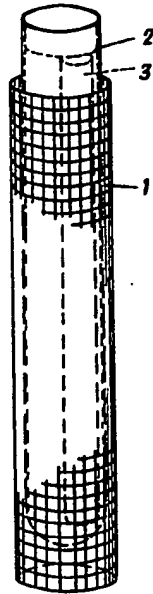


FIG.2

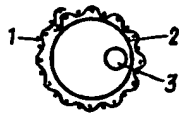


FIG.3

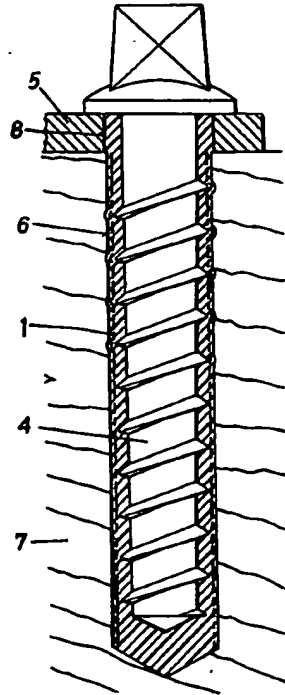


FIG.4

